

Princeton University

COS 217: Introduction to Programming Systems

Manipulating C Strings

String Operation	String in Stack	String in Rodata Section
Allocating memory for a string	<pre>{ char acStr[5]; ... }</pre>	<pre>{ "hi"... ... }</pre>
Initializing a string	<pre>{ char acStr1[3] = {'h', 'i', '\0'}; char acStr2[] = {'h', 'i', '\0'}; char acStr3[3] = "hi"; char acStr4[] = "hi"; char acStr5[2] = "hi"; /* truncation */ char acStr6[20] = "hi"; ... }</pre>	<pre>{ "hi"... ... }</pre>
Computing the length of a string	<pre>{ char acStr[20] = "hi"; ... strlen(acStr) ... /* Evaluates to 2 */ ... sizeof(acStr) ... /* Evaluates to 20 */ }</pre>	<pre>{ char *pcStr = "hi"; ... strlen(pcStr) ... /* Evaluates to 2 */ ... sizeof(pcStr) ... /* Evaluates to 4 */ }</pre>
Changing the characters of a string	<pre>{ char acStr[20] = "hi"; acStr = "bye"; /* compiletime error */ acStr[0] = 'b'; acStr[1] = 'y'; acStr[2] = 'e'; acStr[3] = '\0'; strcpy(acStr, "bye"); /* Danger of memory corruption. */ }</pre>	(Runtime error to attempt to change the characters of a string that resides in the rodata section)
Concatenating characters onto a string	<pre>{ char acStr[20] = "hi"; acStr += "bye"; /* compiletime error */ acStr[2] = 'b'; acStr[3] = 'y'; acStr[4] = 'e'; acStr[5] = '\0'; strcat(acStr, "bye"); /* Danger of memory corruption. */ }</pre>	(Runtime error to attempt to change the characters of a string that resides in the rodata section)

Comparing one string with another	<pre>{ char acStr1[] = "hi"; char acStr2[] = "bye"; if (acStr1 < acStr2) ... /* Legal, but compares addresses!!! */ if (strcmp(acStr1, acStr2) < 0) ... /* Compares strings */ }</pre>	(Same as string in stack)
Reading a string	<pre>{ char acStr[20]; iConvCount = scanf("%s", acStr); /* Reads a word as a string. Grave danger of memory corruption. */ iRet = gets(acStr); /* Reads a line as a string, removing the \n character. Grave danger of memory corruption. */ iRet = fgets(acStr, 20, stdin); /* Reads a line as a string, retaining the \n character. */ }</pre>	(Runtime error to attempt to change the characters of a string that resides in the rodata section)
Writing a string	<pre>{ char acStr[] = "hi"; iCharCount = printf("%s", acStr); /* Writes a string. */ iSuccessful = puts(acStr); /* Writes a string, appending a \n character. */ iSuccessful = fputs(acStr, stdout); /* Writes a string. */ }</pre>	(Same as string in stack)
Converting a string to another type	<pre>{ char acStr[] = "123"; int i; long l; double d; iConvCount = sscanf(acStr, "%d", &i); i = atoi(acStr); l = atol(acStr); d = atof(acStr); }</pre>	(Same as string in stack)
Converting another type to a string	<pre>{ char acStr[20]; int i = 123; iCharCount = sprintf(acStr, "%d", i); /* Danger of memory corruption. */ }</pre>	(Runtime error to attempt to change the characters of a string that resides in the rodata section)

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